

**STOP THE  
BLEED**

TAC SIM TRAINING

## Stop the Bleed Training for Immediate Responders

The average time for a person to bleed out is between three to five minutes. Jack Sava, MD, director of the Gold Surgery team at MedStar Washington Hospital Centre is quoted saying “An adult can die in less than five minutes from a bleeding wound in a critical area.” With rising knife attacks and emergency response times or the average time it takes an ambulance to arrive, you must know how to control bleeds.

Example 1:

A one-inch penetrating slash to the inside of the forearm between the radius and ulna bones will sever the radial artery. This artery runs across the top of the radius bone 2 – 4 inches behind the base of the thumb. Severing this artery can result in unconsciousness in as little as 30 seconds and death in as little as 2 minutes.

Example 2:

The Brachial artery runs along the inside of your arms. This artery is deep, however, severing it will result in unconsciousness in as little as 15 seconds and death in as little as 90 seconds.

### Immediate Responders

Immediate responders – Individuals at the scene who can immediately control bleeding with their hands and available equipment.

Professional first responders – Prehospital responders at the scene with the appropriate equipment and training.

Trauma professionals – Hospital health care professionals with the equipment and skills to provide definitive care.

*The Addendum to the NHS Constitution requires all ambulance trusts to:*

*Respond to Category 1 calls in 7 minutes on average and respond to 90% of Category 1 calls in 15 minutes.*

*Respond to Category 2 calls in 18 minutes on average (amended to 30 minutes for 2023/24) and respond to 90% of Category 2 calls in 40 minutes.*

**A person can bleed out in 3 to 5 minutes, therefore immediate responders might be that person's only chance of survival.**

Another example would be a motor vehicle incident involving someone severely bleeding. Instead of arriving within a few minutes, Emergency Medical Services (EMS) and other first responders may be significantly delayed due to the traffic caused by the incident. These two examples illustrate the importance of immediate responders' ability to stop the bleeding until first responders arrive on the scene or until the person arrives at the emergency room.

Although the term immediate responders might be new to some, there has been an increase in this type of response. Examples include events/venue staff, coaches, athletic trainers, security officers, and Community Emergency Response Team members. Cardiopulmonary resuscitation and automated external defibrillator (CPR/AED), basic first aid, search and rescue, locating lost children, etc. are typical training topics for immediate responders. Added to this list of training opportunities should be administering lifesaving STOP THE BLEED measures (direct pressure, wound packing, tourniquet application).

According to the American College of Surgeons, bleeding is “the most common cause of preventable death after injury.” As such, it is important to know how to stop the bleeding and not rely on first responders who may take too long to reach critically bleeding victims.

**Blood loss is responsible for 35% of pre-hospital deaths.**

*Uncontrolled bleeding is a major cause of preventative deaths. Approximately 40% of trauma-related deaths worldwide are due to bleeding or its consequences.*

| Average time to bleed out | Average time for first responders to arrive | Trauma-related deaths worldwide due to bleeding |
|---------------------------|---|---|
| <b>3 to 5 minutes</b>     | <b>7 to 10 minutes</b>                      | <b>40%</b>                                      |

"Bleed out time" refers to how long it takes for a person to die from blood loss after a major injury, typically when a large blood vessel is damaged and not controlled. Several factors influence bleed-out time, including the location of the injury, the size of the damaged vessel, and the overall health of the person.

Here's a breakdown of bleed-out times based on the severity and location of the injury:

- 1. Arterial Bleeding** (e.g., femoral, brachial, carotid arteries):
  - **Time to bleed out:** This can occur in as little as **1-3 minutes** without intervention.
  - Arterial blood is bright red and spurts out in sync with the heartbeat, making it one of the most dangerous types of bleeding.
- 2. Venous Bleeding** (e.g., from a large vein such as the jugular):
  - **Time to bleed out:** It may take **3-10 minutes**.
  - Venous blood is darker and flows more steadily compared to arterial bleeding.
- 3. Capillary Bleeding:**
  - **Time to bleed out:** Capillary bleeding is usually slow and not life-threatening unless associated with larger injuries. It typically does not cause death on its

own.

#### 4. **Internal Bleeding** (e.g., due to ruptured organs or trauma):

- **Time to bleed out:** It depends on the severity and the organ involved, but significant internal bleeding can cause death in **minutes to hours** without treatment. For example, bleeding from major organs like the liver or spleen can cause death within minutes if untreated.

#### 5. **Penetrating Trauma**

- **Description:** Blood loss from stab wounds, gunshots, or shrapnel.
- **Characteristics:**
  - Depending on the location, both arterial and venous bleeding can occur.
  - Internal bleeding might occur without visible external bleeding.
- **Example:** A gunshot wound to the abdomen may lead to internal bleeding, affecting organs like the liver or kidneys, while visible blood may be minimal.

#### 6. **Amputation**

- **Description:** A severed limb or digit leads to heavy blood loss.
- **Characteristics:**
  - If major arteries are severed, arterial bleeding will occur.
  - Venous bleeding may also be significant depending on the location.
- **Example:** A traumatic accident involving machinery severing a limb, causing the victim to bleed out rapidly if the wound is not immediately compressed or a tourniquet is applied.

#### 7. **Blunt Force Trauma with Internal Bleeding**

- **Description:** Internal organs are damaged, causing internal bleeding.
- **Characteristics:**
  - There may be no visible external blood.
  - Symptoms include bruising, swelling, pain, and signs of shock (like pale skin and faintness).
- **Example:** A car accident causing rupture of the spleen or liver, leading to blood pooling inside the abdomen.

## Factors that Influence Bleed-Out Time:

- **Type and size of the vessel:** Larger arteries and veins lead to faster blood loss.
- **Location of the injury:** Injuries closer to the heart or in major vascular areas can cause faster bleed-outs.
- **Coagulation and clotting factors:** If the person has clotting disorders, the bleed-out time can be shorter.
- **First aid response:** Immediate medical interventions like pressure, tourniquets, or clotting agents can significantly prolong survival.

For example, without treatment, a severe femoral artery injury could lead to death within 2-5 minutes, while bleeding from a smaller vessel in the arm or leg could take 15-30 minutes or more.

## Medical Equipment to Stop Life-Threatening Bleeds

In emergencies where someone is experiencing life-threatening bleeding, prompt and effective intervention is crucial. Several pieces of medical equipment are designed to help control and stop severe bleeding, particularly from large blood vessels. Here's a breakdown of key equipment used to stop life-threatening bleeds:

### Tourniquets

Tourniquets are one of the most effective tools for stopping severe bleeding from extremities (arms or legs).

Types:

#### 1. Combat Application Tourniquet (C-A-T)

- **Description:** The C-A-T is one of the most widely used tourniquets in the UK, especially among military and paramedic services. It is a single-use, lightweight tourniquet with a self-adhering band and a windlass system for tightening.
- **Key Features:**
  - Easy to apply with one hand.
  - Windlass system to increase pressure and stop arterial blood flow.
  - Velcro strap to secure the tourniquet once tightened.

#### 2. SOF Tactical Tourniquet (SOFTT)

- **Description:** The SOFTT-W (Special Operations Forces Tactical Tourniquet-Wide) is another commonly used tourniquet in the UK, particularly among military and police forces. It is made from a durable, wide strap and a metal windlass for extra pressure.
- **Key Features:**
  - Metal windlass for strength and durability.
  - Wider strap, reducing the risk of tissue damage.
  - Suitable for high-tension use in extreme conditions.

### 3. SAM XT Extremity Tourniquet

- **Description:** The SAM XT (Extremity Tourniquet) uses a patented TRUFORCE buckle technology that auto-locks once enough pressure is applied. It requires fewer turns of the windlass, making it faster and easier to apply.
- **Key Features:**
  - Automatic locking mechanism.
  - Less need to manually adjust the windlass.
  - Rigid buckle for secure fit and tension.

### 4. SWAT-T Tourniquet

- **Description:** The SWAT-T (Stretch, Wrap, and Tuck Tourniquet) is a versatile, elastic tourniquet that can also serve as a pressure dressing. It's particularly useful for paediatric and smaller patients or when a traditional windlass tourniquet can't be applied.
- **Key Features:**
  - Easy to apply, requiring only stretch and wrap.
  - Multi-functional (can also be used as a compression bandage).
  - Compact and lightweight, ideal for carrying in emergency kits.

### 5. RATS Tourniquet (Rapid Application Tourniquet System)

- **Description:** The RATS tourniquet is a compact, easy-to-use tourniquet featuring a bungee cord and metal cleat for quick application. It is designed for rapid deployment in situations requiring quick haemorrhage control.
- **Key Features:**

- Fast application, using a simple bungee cord.
- Compact and lightweight, making it easy to carry.
- Suitable for use on small limbs or in paediatric cases.

## 6. Emergency and Military Tourniquets (EMT)

- **Description:** The EMT tourniquet is a simple, low-cost tourniquet used by some emergency services in the UK. It typically consists of a Velcro strap and a windlass for tightening.
- **Key Features:**
  - Lightweight and easy to use.
  - Typically a single-use product.
  - Designed for use by **civilians** and **first responders**.

## 7. Improvised Tourniquets

- In emergency situations where commercial tourniquets are unavailable, improvised tourniquets using belts, scarves, or strong materials can be applied. These are less reliable and potentially harmful if used incorrectly, but may be necessary in certain situations.
- **When to use:** Severe, uncontrolled bleeding from a limb that cannot be stopped with direct pressure alone.
- **How it works:** It cuts off blood flow to the injured limb by tightly compressing the tissue and vessels above the injury site.

## Haemostatic Dressings

Haemostatic dressings are gauze impregnated with agents that promote blood clotting to control bleeding in wounds.

- **Types:**
  - **QuikClot® Combat Gauze:** Contains a clotting agent (kaolin) that accelerates the body's natural clotting process.
  - **Celox®:** A chitosan-based product derived from shellfish, designed to clot blood quickly, even in patients with clotting disorders.

- **HemCon®**: Another chitosan-based haemostatic dressing, ideal for external bleeding.
- **When to use**: For deep wounds or injuries that are not easily controlled with direct pressure alone, particularly in junctional areas (groin, armpits) where tourniquets are ineffective.

### Pressure Dressings/Bandages

Pressure dressings provide sustained pressure on a wound to stop bleeding.

- **Types**:
  - **Israeli Bandage**: A pressure dressing with an elastic bandage and pressure applicator built in. It's designed to be applied quickly, even by the injured person themselves.
  - **Emergency Trauma Dressing (ETD)**: Another effective pressure bandage designed for quick application, commonly used by first responders.
- **When to use**: After applying direct pressure to a wound, pressure dressings help maintain pressure and control bleeding until medical help arrives.

### Junctional Tourniquets

Junctional tourniquets are specialized devices designed to stop bleeding in areas where traditional tourniquets can't be used, like the pelvis, armpits, or neck.

- **Types**:
  - **Combat Ready Clamp (CRoC)**: Designed to compress large vessels like the femoral artery in the groin.
  - **Junctional Emergency Treatment Tool (JETT)**: Used to control bleeding in junctional areas.
- **When to use**: For injuries in the pelvic or axillary regions where traditional tourniquets cannot be applied.

### Chest Seals

Chest seals are used to treat open chest wounds (e.g., gunshot or stab wounds) that can lead to life-threatening conditions like pneumothorax.

- **Types**:



- **HyFin® Vent Chest Seal:** Features a one-way valve that allows air to escape but prevents it from re-entering, addressing issues with sucking chest wounds.
- **Asherman Chest Seal (ACS):** Another vented chest seal that allows air to escape while sealing the wound to prevent air from entering the chest cavity.
- **When to use:** For chest trauma that may cause a pneumothorax (collapsed lung), often referred to as a sucking chest wound.

### Wound Packing Materials

Wound packing involves stuffing deep wounds with gauze to apply pressure from within, helping to control bleeding.

- **Types:**
  - **Compressed Gauze:** Standard sterile gauze used to fill the wound space and apply pressure directly to the bleeding vessel.
  - **Haemostatic Gauze:** As mentioned above, some gauze is impregnated with clotting agents (like QuikClot) for added hemostatic effects.
- **When to use:** For deep wounds, especially in the groin or armpit where tourniquets aren't effective.

### Surgical Clamps (Haemostats)

Haemostats are small surgical tools used to clamp blood vessels, preventing blood flow through them.

- **When to use:** Often used in surgical settings, but in a field or trauma setting, they can be used by medical professionals to temporarily clamp a major artery or vein.

### Emergency Bandages

These are multipurpose dressings designed to stop bleeding through a combination of pressure and protection of the wound.

- **Examples:**
  - **H-Bandage:** Has a unique H-shaped pad that allows more control and pressure on the wound.
  - **Olaes® Modular Bandage:** Has a built-in gauze roll for wound packing, a pressure cup for direct pressure, and a plastic sheet for an occlusive dressing.

- **When to use:** For larger wounds where additional pressure and wound protection are required.

### **Surgical Tourniquets (for medical professionals)**

Surgical tourniquets are used in controlled hospital environments to limit blood flow during surgery but can also be used for haemorrhage control.

- **When to use:** In emergency or hospital settings, particularly by trained professionals to control bleeding during surgery or trauma care.

### **Improvised Methods**

In some emergencies, when proper medical equipment is not available, improvised methods may need to be used:

- **Improvised tourniquets:** Use of belts, scarves, or any strong material that can be tightened above the injury.
- **Direct pressure:** Use of hands, clothing, or makeshift bandages to apply pressure to the wound until medical help arrives.

### **Summary:**

- **Tourniquets** are essential for extremity injuries.
- **Haemostatic dressings and wound packing** are vital for deep wounds, particularly in junctional areas.
- **Pressure dressings and chest seals** provide immediate control for trauma injuries that are not easily managed by direct pressure alone.
- **Junctional tourniquets and specialised equipment** are used in areas that are not reachable by traditional methods.

Having access to these tools and knowing how to use them properly can significantly improve survival rates in traumatic situations.

### **Stop The Bleed Procedures**

"Stop the Bleed" is a set of life-saving techniques designed to control severe bleeding in emergency situations. The goal is to quickly stop or slow down the bleeding until

professional medical help arrives, as uncontrolled haemorrhage can lead to death in minutes. Below are the key procedures to follow when dealing with severe bleeding:

### 1. Ensure Safety

- **Assess the scene:** Make sure it's safe to approach the injured person.
- **Use protective gear:** If available, put on gloves to protect yourself from exposure to blood.

### 2. Call for Help

- **Dial emergency services:** Call 911 or your local emergency number immediately.
- **Provide details:** Tell them your location and describe the injury and bleeding severity.

### 3. Identify Life-Threatening Bleeding

Look for these signs to determine if bleeding is life-threatening:

- Blood that is spurting out.
- Blood that won't stop flowing.
- Blood pooling on the ground.
- Clothing soaked in blood.
- Loss of body parts (e.g., fingers, toes, limbs).

### 4. Expose the Wound

- **Remove clothing:** Cut or tear away clothing to clearly see the wound. This helps assess the severity and determine the appropriate response.

### 5. Apply Pressure

- **Use both hands:** Apply **direct pressure** to the wound using your hands or fingers, focusing on where the blood is coming from.
- **Apply a dressing:** If you have a clean cloth, gauze, or bandage, press it firmly onto the wound.

- **Maintain pressure:** Keep constant pressure until medical professionals take over.

**If the bleeding is not controlled with direct pressure, you may need to use advanced techniques like packing the wound or applying a tourniquet.**

## 6. Wound Packing

- **For deep wounds:** If the wound is large and deep (e.g., a gunshot wound), **pack it** with gauze, a clean cloth, or haemostatic dressing (if available).
  - **Step 1:** Stuff the material directly into the wound, aiming to fill the cavity as much as possible.
  - **Step 2:** Continue applying firm, direct pressure after packing the wound.
- **Do not pack chest or abdominal wounds:** Wounds in the chest or abdomen require special attention by medical professionals and should not be packed.

## 7. Tourniquet Application

- **When to use a tourniquet:** If bleeding from an arm or leg cannot be controlled by direct pressure, a tourniquet may be necessary.
- **Proper placement:**
  - Place the tourniquet **2 to 3 inches above the wound**, but **not over a joint** (e.g., knee or elbow).
  - Tighten the tourniquet until the bleeding stops.
  - **Document the time** the tourniquet was applied, as it should not be left on for more than 2 hours without medical oversight.
- **Commercial tourniquet:** Use if available, such as a Combat Application Tourniquet (CAT).
- **Improvised tourniquet:** If you don't have a commercial tourniquet, use a long, strong fabric and a rigid object (e.g., a stick or pen) to tighten it. However, an improvised tourniquet is less reliable and should be a last resort.

## 8. Monitoring the Patient

- **Check for signs of shock:**
  - Pale, cool, or clammy skin.
  - Rapid breathing.

- Weak or absent pulse.
- Loss of consciousness.
- **Keep the patient calm:** Try to reassure the person and keep them still.
- **Position the patient:** If the person shows signs of shock, lay them down with their feet elevated (if no head, neck, or back injuries are suspected).

## 9. Additional Measures

- **Apply a second tourniquet if necessary:** If one tourniquet is not enough to stop the bleeding, apply a second one just above the first.
  - **Reassess bleeding control:** Always check if the bleeding has stopped after applying any intervention.
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### Summary of Key Steps:

1. **Ensure scene safety** and wear gloves if available.
2. **Call emergency services.**
3. **Apply direct pressure** to the wound.
4. **Pack the wound** if the bleeding is severe and the wound is deep.
5. **Use a tourniquet** for uncontrollable bleeding from arms or legs.
6. **Monitor the patient for shock** and keep them calm until help arrives.

By acting quickly with these techniques, you can save a life during emergencies involving severe bleeding.